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Filing Date	11/26/2001
First Named Inventor	Martin Andrew Schlosser
Art Unit	3726
Examiner Name	Stephen Kenny
Attorney Docket Number	30515.002

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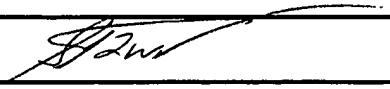
Signature			
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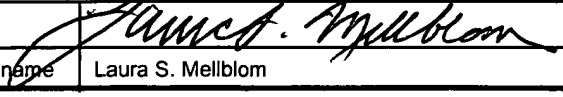
Signature			
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Setter Ollila LLC
2060 Broadway
Suite 300
Boulder, Colorado 80302

PATENT APPLICATION

ATTORNEY DOCKET NO. 35015/002

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): **Martin A. Schlosser**

Serial No.: **09/994,257** **Examiner: Stephen Kenny**

Filing Date: **11/26/2001** **Group Art Unit: 3726**

Title: **METHOD OF MANUFACTURING A FLOWMETER FOR THE PRECISION MEASUREMENT OF AN ULTRA PURE MATERIAL FLOW**

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BRIEF ON APPEAL

INTRODUCTION

Pursuant to the provisions of 37 CFR § 1.191 *et seq.*, applicants hereby appeal to the Board of Patent Appeals and Interferences (the "Board") from the examiner's final rejection dated 1/10/2005. A notice of appeal was sent on the same day as this appeal brief. This brief on appeal is being filed in triplicate (37 CFR § 1.192(a)) and is accompanied by the requisite fee (37 CFR 1.192(a) and 1.17(f)).

REAL PARTY IN INTEREST

The entire interest in the present application has been assigned to Emerson Electric Co. as recorded at Reel 012334, Frame 0370.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

Claims 1, 3 – 10, 12 – 19, 23 – 27, 30 – 33, and 50 – 51 are pending.

Claims 1, 7 – 10, 12 – 19, 23, 24, 26, 27, 30 – 33, and 50 – 51 have been finally rejected.

Claims 3 – 6 and 25 are objected to as being dependent on a rejected base claim, but would be allowable if re-written in independent form.

Claims 1, 7 – 10, 12 – 19, 23, 24, 26, 27, 30 – 33, and 50 – 51 are on appeal.

STATUS OF AMENDMENTS

There are no pending amendments.

SUMMARY OF INVENTION

This invention generally relates to the manufacture of a Coriolis flow meter having a flow tube composed entirely of perfluoroalkoxy copolymer (PFA) or PTFE, which is a non-rigid plastic material. Typically Coriolis flow meters have flow tubes made from a rigid material, for example glass or metal (Page 1 lines 30 – 35). Coriolis flow meters operate by vibrating the flow tube and measuring the phase of the vibration at two different locations on the vibrating flow tube. Material flowing in the flow tube cause Coriolis forces to act upon the flow tube and change the phase of vibration between one end of the flow tube and the other end of the flow tube. The measured phase difference is directly proportional to the flow of the material in the flow tube (Page 1 lines 10 – 29).

Coriolis flow meters having flow tubes made from rigid materials, for example glass or metal, are well known in the arts. Metal or glass flow tubes have a problem that the flow tubes may contaminate the material flowing through the flow meter. This is undesirable for systems in which material of an ultra high level of purity must be delivered by the flowmeter to a user

application. This is the case in the fabrication of semi-conductor wafers which requires the use of a process material that is free of contaminants including ions migrating from the tubes of the process material flow path. In such applications, the flow tube can be a source of contaminants. The metal walls of a flow tube can release ions into the process material flow. The released ions can cause the chips on a semi-conductor wafer to be defective. The same is true for a glass flow tube which can release the lead ions from the glass into the process material flow. The same is also true for the flow tubes formed of conventional plastics. A plastic termed PFA is free from this objection since the material of which it is composed does not release deleterious ions into the material flow (starting at page 2 line 33 through page 3 line 10).

The current application discloses a Coriolis flowmeter having at least one flow tube formed of perfluoroalkoxy copolymer (PFA) plastic which is coupled to a driver and to at least one pick-off sensor to enable the PFA flow tube to function as part of Coriolis flowmeter that can provide accurate output information over range of operating conditions for a material flow and ultra high purity suitable for use in applications such as semi-conductor fabrication and the like which require the material flow to be free of contaminants and to the ionic level (page 3 lines 16 – 23).

ISSUES

1. Whether claims 1, 7 – 10, 12 – 19, 23, 24, 26, 27, 30 – 33, and 50 – 51 are unpatentable under 35 U.S.C. § 103(a) over Sipin (US 4,559,833) in view of Cucci (US 5,672,832).

GROUPING OF CLAIMS

For the purpose of this appeal claims 1, 7 – 10, 12 – 19, 23, 24, 26, 27, 30 – 33, and 50 – 51 stand or fall together.

ARGUMENT

OUTLINE

I. Summary of the brief on appeal.

II. Summary of the requirements for *prima facie* obviousness.

III. Claims 1, 7 – 10, 12 – 19, 23, 24, 26, 27, 30 – 33, and 50 – 51 rejection.

I. Summary of the brief on appeal

A. The 35 U.S.C. § 103(a) rejection of claims 1, 7 – 10, 12 – 19, 23, 24, 26, 27, 30 – 33, and 50 – 51 is improper because a *prima facie* case for obviousness has not been established, for the following reasons: (1) the cited art does not teach or suggest every element of the claim, (2) the examiner incorrectly characterizes the cited art, (3) the examiner's conclusion of obviousness is based on improper hindsight reasoning, (4) there was no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings (5) the combined cited art is from non-analogues fields.

II. Summary of the requirements for *prima facie* obviousness.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck,* 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

MPEP 2143.03

The prior art reference (or references when combined) must teach or suggest all the claim limitations. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

If an independent claim is nonobvious under 35 U.S.C. 103, then any claim dependent therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

MPEP 2142.

"To establish a prima facie case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings."

"To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings." MPEP 2142. "The teaching or suggestion to make the claimed combination... must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2ed 488, 20 USPQ2ed 1438 (Fed. Cir. 1991). "The level of skill in the art cannot be relied upon to provide the suggestion to combine references." *Al-Site corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999). "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggest the desirability of the combination" In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

III. Claims 1, 7 – 10, 12 – 19, 23, 24, 26, 27, 30 – 33, and 50 – 51 rejection.

Claims 1, 7 – 10, 12 – 19, 23, 24, 26, 27, 30 – 33, and 50 – 51 have been finally rejected as being unpatentable under 35 U.S.C. § 103(a) over Sipin (US 4,559,833) in view of Cucci (US 5,672,832). Claim 1 requires:

1. A method of manufacturing a Coriolis flowmeter adapted to extend a received process material flow having an ultra high level of purity free from contamination due to ion transfer

from said Coriolis flow meter to said process material; said method comprising the steps of:

coupling a flow tube means to a base, wherein said flow tube means is formed entirely from PTFE or PFA;

affixing a driver to said flow tube means;

coupling a pick-off means to said flow tube means; and

affixing inlet and outlet ends of said flow tube means to at least one process connection.

Sipin discloses a method to manufacture a Coriolis flow meter. The examiner states that "Sipin does not explicitly disclose that the flow tube means is made entirely of PTFE or PFA material", see page 2 of the final office action. The examiner then cites Cucci as a flow meter that discloses a flow tube made entirely of PTFE and states that it would have been obvious to combine Cucci with Sipin.

Cucci is not a Coriolis flow meter as required by claim 1. Cucci is a differential pressure flow meter. Differential pressure flow meters do not measure a phase difference in a vibrating flow tube to determine the flow of material. Differential pressure flow meters don't even vibrate. Differential pressure flow meters operate on a completely different principle than Coriolis flow meters. A differential pressure flow meter typically measures the pressure drop across a restriction in the flow tube. A differential pressure flow meter is non-analogues art to the field of Coriolis flow meters with respect to flow tube design. Furthermore Cucci does not provide any teaching as to how the vibrating flow tube in a Coriolis Flow meter could be formed from a non-rigid plastic like PTFE. In other prior art Coriolis flow meters PTFE was used to coat the inside of a vibrating metal flow tube. However there is no known prior art Coriolis flow meters that successfully operate a vibrating flow tube made entirely from PTFE. Therefore there is no expectation of success in the blind substitution of the differential pressure flow tube from Cucci into the vibrating Coriolis flow tube in Sipin.

To form a legally sustainable 35 U.S.C. §103(a) obviousness rejection the Examiner must set forth a believable characterization of how the disclosures of the two references could be combined to form an operable structure that makes obvious the applicants' claimed invention. In so doing the Examiner must not employ hindsight.

The flow tube of a Coriolis flow meter is a critical element of the Coriolis flow meter and a change in the flow tube material from metal to PFA or PTFE would result in a drastic change in the functionality of the modified Coriolis flow meter. The characteristics of PFA or PTFE are

completely different than the comparable characteristics of glass or metal. PFA or PTFE tubes are slippery, flaccid, and difficult to work with. Glass and metal Coriolis flow tubes are rigid, easily coupled to other structural elements, and have distinct and well defined vibration modes. It is believed that the examiner has used impermissible hindsight to substitute a PTFE material into the vibrating flow tube of a Coriolis flow meter.

The Examiner's rejection of claim 1 is also devoid of evidence proving motivation to combine. The format of the Examiner's 35 U.S.C. §103(a) rejection is to characterize the disclosure of the cited references and then to conclude with an unsupported assertion that it would be obvious to combine the two references to anticipate the rejected claim.

Page 700-31 of column 1 of MPEP §706.02(j) states that:

> ...the burden is on the Examiner to provide the suggestion of desirability of doing what the Examiner has done. It further states that the references must expressly or impliedly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in the light of the teaching of the references.

The Examiner's rejection does not meet these requirements. The examiner has not cited where the references "expressly or impliedly suggest the claimed invention". And the examiner has not presented a convincing line of reasoning how someone skilled in the arts would have been motivated to combine the flow tube from a differential pressure flow meter with the vibrating flow tube of a Coriolis flow meter.

For the reasons cited above it is believed that claim 1 is allowable as written.

Claims 7 – 10, 12 – 19, 23, 24, 26, 27, 30 – 33, and 50 – 51 are dependent on allowable claim 1 and are therefore allowable.

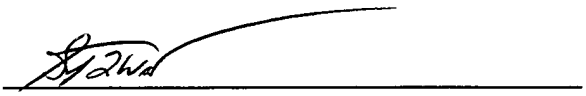
Conclusion

In view of the above, applicant respectfully request that the examiner's rejection of claims 1, 7 – 10, 12 – 19, 23, 24, 26, 27, 30 – 33, and 50 – 51 be reversed.

The Director is hereby authorized to charge the fee for filing a brief in support of an appeal and to charge any fees which may be required, or credit any overpayment to Deposit Account No. 502622.

Respectfully submitted,

Date: 3/8/05



SIGNATURE OF PRACTITIONER
Steven L. Webb, Reg. No. 44,395
Setter Ollila LLC
Telephone: (303) 938-9999 ext. 22
Facsimile: (303) 938-9995

CORRESPONDENCE ADDRESS: **CUSTOMER NO. 32827**

APPENDIX I
CLAIMS CURRENTLY PENDING

1. A method of manufacturing a Coriolis flowmeter adapted to extend a received process material flow having an ultra high level of purity free from contamination due to ion transfer from said Coriolis flow meter to said process material; said method comprising the steps of:

coupling a flow tube means to a base, wherein said flow tube means is formed entirely from PTFE or PFA;

affixing a driver to said flow tube means;

coupling a pick-off means to said flow tube means; and

affixing inlet and outlet ends of said flow tube means to at least one process connection.

2. (Canceled)

3. The method of claim 1 characterized in that said step of coupling said flow tube means to said base is proceeded by the step of etching said flow tube means to create a surface suitable for coupling and affixing flowmeter components.

4. The method of claim 3 characterized in that said etching step comprises the step of using an etching solution containing a glycol diether.

5. The method of claim 3 characterized in that said etching step comprises the step of heating an etching solution to an elevated temperature.

6. The method of claim 3 characterized in that said etching step comprises the step of agitating said flow tube means in an etching solution.

7. The method of claim 1 characterized in that said step of coupling said flow tube means to said base is proceeded by the step of straightening said flow tube means to eliminate any inherent curvature or unwanted residual bends.

8. The method of claim 7 characterized in that said straightening step comprises the steps of:

placing said flow tube means in a straightening fixture;

heating said flow tube means and said straightening fixture;

cooling said flow tube means and said straightening fixture; and

removing said flow tube means from said straightening fixture.

9. The method of claim 1 characterized in that said step of coupling said flow tube means to said base comprises the step of attaching said flow tube means to said base using adhesive.

10. The method of claim 9 characterized in that said step of coupling said flow tube means to said base using said adhesive comprises the step of using cyanoacrylate adhesive.

11. (Canceled)

12. The method of claim 1 characterized in that said step of affixing said driver means to said flow tube means further comprises the step of
attaching said driver means to said flow tube means using adhesive.

13. The method of claim 12 characterized in that said step of affixing said driver means to said flow tube means further comprises the step of using cyanoacrylate adhesive.

14. The method of claim 1 characterized in that said step of coupling said pick-off means to said flow tube means further comprises the step of attaching said pick-off means to said flow tube means using adhesive.

15. The method of claim 14 characterized in that said step of coupling said pick-off means to said flow tube means further comprises the step of using cyanoacrylate adhesive.

16. The method of claim 1 further comprising coupling said at least one process connection to said base.

17. The method of claim 16 characterized in that the step of coupling said process connection to said base comprises the steps of:

forming a receiving hole into said base; and

securing a fixed element of said process connection into said receiving hole.

18. The method of claim 17 characterized in that the step of securing said fixed element of said process connection into said receiving hole comprises the step of adhering said fixed element of said process connection into said receiving hole.

19. The method of claim 18 characterized in that said step of adhering said fixed element of said process connection into said receiving hole further comprises the step of using cyanoacrylate adhesive.

20. (Canceled)

21. (Canceled)

22. (Canceled)

23. The method of claim 16 characterized in that said step of coupling said process connection to said base comprises the step of adhering a fixed element of said process connection onto said base.

24. The method of claim 23 characterized in that said step of adhering said process connection to said base further comprises the step of using cyanoacrylate adhesive.

25. The method of claim 1 characterized in that said step of affixing said ends of said flow tube means to said at least one process connection comprises the steps of:

flaring said end of said flow tube means; and

inserting said flared end of said flow tube means onto conical stub of said at least one process connection.

26. The method of claim 1 characterized in that said step of affixing said end of said flow tube means to said at least one process connection comprises the steps of:

inserting said end of said flow tube means through said at least one process connection until said end of said flow tube means are flush with face of said at least one process connection; and

sealing said end of said flow tube means to said face of said at least one process connection.

27. The method of claim 26 characterized in that said step of sealing said end of said flow tube means to said face of said at least one process connection comprises the step of adhering said end of said flow tube means to said face of said at least one process connection.

28. (Canceled)

29. (Canceled)

30. The method of claim 26 characterized in that said step of sealing said end of flow tube means to said face of said at least one process connection comprises the step of laser welding said end of said flow tube means to said face of said at least one process connection.

31. The method of claim 1 characterized in that said step of coupling said pick-off means to said flow tube means comprises the step of making portions of said flow tube means opaque in order to facilitate use of optical pick-offs.

32. The method of claim 1 further comprising affixing a temperature sensing device to said Coriolis flowmeter.

33. The method of claim 32 characterized in that said step of affixing a temperature

sensing device comprises the step of affixing a resistance temperature measuring device to said Coriolis flowmeter.

34. – 49. (Withdrawn)

50. The method of claim 1 characterized in that said step of affixing inlet and outlet ends of said flow tube means to the at least one process connection further comprises the step of forming the at least one process connection from PTFE or PFA to form an ultra pure flow path for a process material flow through said flowmeter.

51. The method of claim 1 characterized in that said step of affixing inlet and outlet ends of said flow tube means to the at least one process connection further comprises the step of forming the at least one process connection entirely from PTFE or PFA to form an ultra pure flow path for a process material flow through said flow meter.